REMARKS

Claims 1 and 12 were rejected under 35 U.S.C. § 112, second paragraph. The Examiner considered claim 1 to be indefinite with respect to the content of the silicon oxide filler. Although claim 12 is said to be rejected for the same reason, claim 12 is not directed to the silicon oxide filler. Additionally, claims 4 and 5 were objected to as not further limiting the subject matter of claim 1 from which they depend.

In response, claim 1 has been amended to more clearly recite that the metal oxide filler contains a silicon oxide filler in the amount of not less than 60 % by weight of the metal oxide filler. Support is found, for example, bridging pages 3-4 of the specification. The amendment is for clarification only, and does not narrow the scope of the claim.

Claim 12 has been amended to more clearly define the basis for determining the increase in particle generation rate.

Claim 15 has also been amended for clear definition.

Applicants disagree the Examiner with regard to claims 4 and 5.

Claims 4 and 5 define, in part, the content of the silicon oxide filler. Thus, for example, when the elastomer composition contains the silicon oxide filler in an amount of 1 part by weight per 100 parts by weight of the elastomer component, then the elastomer composition may contain a second metal oxide filler different from silicon oxide in an amount of up to 0.67 parts by weight per 100 parts of the elastomer component. That is, silicon oxide must account for not less than 60% by weight of the metal oxide filler (1.67 x 60% = 1.00).

Thus, claims 4 and 5 are consistent with claim 1, and further limit the subject matter of claim 1 from which they depend.

In view of the above, it is respectfully submitted that the claims presented herein fully comply with 35 U.S.C. § 112, and withdrawal of the foregoing rejection is respectfully requested.

Claims 1-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 6,191,233 to Kishine et al. Kishine et al. was cited as disclosing a peroxide-curable elastomer containing fluorinated triallyl isocyanurates and which further may contain a silicon oxide filler. The resulting composition is said to be molded to form a suitable article.

Applicants traverse, and respectfully request the Examiner to reconsider in view of the Declaration evidence submitted herewith and the following remarks.

The crosslinkable elastomer composition of present claim 1 is characterized as comprising a metal oxide filler containing a silicon oxide filler in an amount of not less than 60% by weight of the metal oxide filler, wherein the silicon oxide filler has a content of impurity metals other than silicon of not more than 100 ppm.

Applicants' invention is directed to reduction of metal impurities generated from sealing materials used for or installed in semiconductor apparatuses which are operated under severe conditions, such as exposure to plasma treatment and acid treatment.

This object of the invention has been achieved by analyzing metal oxide fillers satisfying the requirement as claimed in present claim 1, namely "silicon oxide filler has a content of

impurity metals other than silicon of not more than 100 ppm which is measured under the following conditions:

(i) the silicon oxide filler is dispersed and dissolved in 50% hydrofluoric acid and is diluted with ultrapure water; and

(ii) contents of metal of the solution are determined through atomic absorption analysis by using an atomic absorption photometer."

Turning to the cited prior art, the means for achieving the above objective and also the problems pointed out in Applicants' specification are not at all taught by Kishine et al.

Kishine et al discloses many regularly used metal oxides including "silicon oxide" as a filler (column 6, lines 31-33), but is silent as to the properties required of the metal oxides (silicon oxide). In such a case, one of ordinary skill would reasonably understand that the metal oxide (silicon oxide) fillers disclosed by Kishine et al are regular, commercially available metal oxide (silicon oxide) fillers.

In this regard, Applicants submit herewith the Declaration Under 37 C.F.R. § 1.132 of Katsuhiko Higashino, a co-inventor of the present application, including test data showing that a regular silicon oxide filler does not satisfy the requirement of present claim 1.

Because there is no concrete description of properties as to the silicon oxide filler in Kishine et al, a commercially available silicon filler SO-25R (product of Admatechs Co., Ltd.) was employed as the closest, representative silicon oxide filler.

SO-25R is a silica filler described in EP 0496419 (EP '419, of record) which was cited during International Preliminary Examination of the corresponding PCT application. EP '419

was cited therein as to lack of novelty and inventive step of the present invention, and the rejections were subsequently withdrawn upon consideration of the same comparative experimental data submitted herewith.

EP '419 discloses a curable silicone composition comprising an aluminum oxide and/or silica powder having an amount of alkali metal ions extracted with 50ml of water at 121°C for 20 hours that is not more than 10 ppm, and is usable as a protective material or encapsulating material for devices such as ICs (Abstract). Further, according to page 2, lines 14-24, particularly lines 19-24 of EP '419, the problem to be solved is directed to reduction of metals corrosive to semiconductor devices (note, not for apparatuses) and extracted amounts thereof.

In the working examples of EP '419, silica is not used as a filler, and the fillers employed therein are all aluminum oxide fillers. The silica filler of EP '419 is explained at page 6, lines 38-41, and high-purity synthetic spherical silica SO-25R and SO-25H (products of Admatechs Co., Ltd.) is disclosed as preferred commercially available silica.

The experiments were conducted using SO-25R (comparative) and 1-FX (used in Applicants' Example 1: High purity synthetic quartz spheroidal silica available from Kabushiki Kaisha Tatsumori) according to the method (titled "Contents of impurity metals in filler") described at page 18, lines 9-19 of the present specification. The results are shown in Table A.

Table A

Imprity metals other than Si	Content (ppm)	
	SO-25R	1-FX
Na	0.7	2
K	0.5	0.4
Ca	30	2
Fe	190	1
Ni	1.3	0.1
Cu	0.7	1
Cr	1.4	0.2
Mg	1	2
Sub total	225.6	8.7
Zn	0.2	0.1
Al	720	0.5
Total	945.8	9.3

As is clear from Table A, SO-25R contains alkali metals (Na, K) in an amount of not more than 10 ppm (0.7 ppm and 0.5 ppm, respectively) according to Applicants' method. However the total amount of other metals (Ca, Fe, Ni, Cu, Cr, Mg) listed in Applicants' Example and alkali metals is 225.6 ppm which is far beyond the upper limit (100 ppm) of Applicants' invention. Further, when adding the amounts of Zn and Al, the total amount is 945.8 ppm. This large amount of impurity metals does not satisfy the clean level required by semiconductor apparatuses.

On the other hand, 1-FX for use in Applicants' invention contains alkali metals in a slightly larger amount than SO-25R. However, the total amount of impurity metals is 9.3 ppm, which is 1/100 or less that of SO-25R and is extremely clean.

As demonstrated in the Declaration, even the closest silica filler SO-25R described in EP '419 (extracted amount of alkali metals in hot water being 1.2 ppm or less) does not satisfy

the requirement of claim 1 of Applicants' invention. Thus, Kishine et al does not disclose (either explicitly or inherently) or suggest the use of a specific, highly pure metal oxide filler.

In summary, Kishine et al describes many types of fillers including metal oxides, hydroxides, carbonates, etc., for use as a filler for the curable elastomer composition described therein. However, there is no disclosure of the impurity metal content of the metal oxide filler of Kishine et al.

Moreover, Kishine et al. does not teach how to reduce the impurity metal content, as described in the present specification, by treating a starting metal oxide filler through extraction with an acid to reduce impurity metal contents and then treating with an alkali to neutralize the remaining acid (page 5, lines 9-13 of the specification). Other than a bald assertion of "matter of choice", the Examiner has not explained how one of ordinary skill would arrive at the claimed invention based on the disclosure of Kishine et al. Furthermore, the Examiner has not set forth any reasonable basis for concluding that the silicon oxide filler of Kishine et al. would inherently (i.e., necessarily) have a content of impurity metals other than silicon of not more than 100 ppm as claimed. As discussed above, nowhere does Kishine et al. discuss impurity metal content or how to treat a silicon oxide filler to have the prescribed impurity metal content.

Applicants believe EP '419, cited during International Preliminary Examination of corresponding PCT application, to be much closer and more relevant to the present invention than Kishine et al. EP '419 specifically identifies "high-purity synthetic spherical silicas" SO-25R and SO-25H for use as a filler. These silicas together with 1-FX (as employed in Applicants' Example 1) were evaluated with respect to metal impurity content, the results of

which are set forth in Table A at page 3 of the Declaration. Although the commercially available silicas have a low alkali metal impurity content, the total metal impurity content was roughly 100 times that of 1-FX, well outside the scope of present claim 1 requiring a silicon oxide filler having a content of impurity metals other that silicon of not more than 100 ppm.

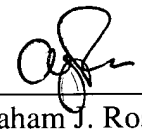
Based on these results, and further considering that one of ordinary skill in reading Kishine et al would understand that a commercially available silicon oxide filler is contemplated, it is clearly seen that Kishine et al does not meet the subject limitation of present claim 1. Also, because Kishine is silent with respect to impurity metal content of the silicon oxide filler (or other fillers for that matter), there is nothing in the cited prior art which teaches the desirability, and hence the obviousness, of reducing the impurity metal content of such silicon oxide filler to an amount of not than 100 ppm as claimed.

In view of the Declaration evidence submitted herewith and the above remarks, it is respectfully submitted that the present claims are patentable over Kishine et al, and withdrawal of the foregoing rejection under 35 U.S.C. § 103(a) is respectfully requested.

Withdrawal of all rejections and allowance of claims 1-18 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

Respectfully submitted,



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WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: November 10, 2003

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Hiroyuki TANAKA et al. Group Art Unit: 1711

Serial Number: 09/869,900 Examiner:RAJGURU, UMAKANT K

Filed: July 6, 2001

For: CROSSLINKABLE ELASTOMER COMPOSITION AND MOLDED ARTICLE PRODUCED FROM SAME

DECLARATION UNDER 37 CFR 1.132

Honorable Commissioner

Washington, D.C. 20231

Sir,

Katsuhiko HIGASHINO, citizen of Japan, duly deposes and says:

1. That he has graduated from Material Science, Integrated Arts and Sciences of Osaka Prefecture University, Japan, in the year of 1989;

2. That he was employed in his capacity since 1997 by DAIKIN INDUSTRIES, LTD.;

3. That he has been engaged in research and development on crosslinkable elastomer composition and fillers contained therein;

4. That he has read and is familiar with the instant application for United States Letters Patent and the Office Action thereto mailed August 8, 2003;

5. That he experimented and proved that the silica filler

SO-25R described in EP496,419 contains a larger amount of impurity metals measured according to the method described in USSN 09/869,900.

EXPERIMENTAL

0.1 Gram of high-purity synthetic spherical silica SO-25R (products by Admatechs Co., Ltd.) was put in a platinum crucible, and after diffused and dissolved in 5 ml of 50 % hydrofluoric acid in a hot bath, is diluted with ultrapure water. Contents of metals of that solution were determined through atomic absorption analysis by using an atomic absorption photometer (Z8000 available from Hitachi, Ltd.). Metals intended to detect were metals shown in Table A. Contents of each metal in the filler were determined by the following equation.

$$\text{Metal content (ppm)} = \frac{\text{Concentration in Solution (ppm)}}{\text{Weight of filler (g)}} \times \text{Weight of Solution (g)}$$

RESULTS

The results are shown in Table A.

In order to compare with the impurity metal contents of silica filler used in USSN 09/869,900, the impurity metal contents of 1-FX (used in Example 1 of USSN 09/869,900: High purity synthetic quartz spheroidal silica available from Kabushiki Kaisha Tatsumori) was also shown in Table A.

Table A

Imprity metals other than Si	Content (ppm)	
	SO-25R	1-FX
Na	0.7	2
K	0.5	0.4
Ca	30	2
Fe	190	1
Ni	1.3	0.1
Cu	0.7	1
Cr	1.4	0.2
Mg	1	2
Sub total	225.6	8.7
Zn	0.2	0.1
Al	720	0.5
Total	945.8	9.3

DISCUSSION

As is clear from Table A, SO-25R contains alkali metals (Na, K) in a content of not more than 10 ppm (0.7 ppm and 0.5 ppm, respectively) according to the method of USSN 09/869,900. However the total content of other metals (Ca, Fe, Ni, Cu, Cr, Mg) listed in Example of USSN 09/869,900 and alkali metals is 225.6 ppm. Further when adding the contents of Zn and Al, the total contgent is 945.8 ppm. This large content of impurity metals does not satisfy the required clean level in the semiconductor apparatuses.

On the other hand, 1-FX usable in USSN 09/869,900 contains a total content of the impurity metals is 9.3 ppm.

The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

This 4th day of November, 2003

by Katsuhiko Higashino

Katsuhiko HIGASHINO

We, the undersigned witnesses, hereby acknowledge that Katsuhiko HIGASHINO is personally known to us and did execute the foregoing Declaration in our presence on:

Date: November 4, 2003 Witness Tsuyoshi Noguchi

Date: November 4, 2003 Witness Hiroyuki Tanaka